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EXAMINER	
PHAM, HUNG Q	
ART UNIT	**PAPER NUMBER**
2172	18

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/409,613	CHRISTOFFERSON ET AL..	
	Examiner	Art Unit	
	HUNG Q PHAM	2172	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40,42 and 44* is/are rejected.

7)☒ Claim(s) *41,43 and 45* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/29/2003 has been entered. Claims 1-45 are pending.

Response to Arguments

2. Applicant's arguments filed 08/2-/2003 have been fully considered but they are not persuasive.

Regarding to claims 1, 10 and 19, as shown in FIG. 8 is the flow chart of the method of checking whether an element to be added to a linked list is a duplicate of one already on the list. A hash bit map as a data structure is provided and initialized to 0 in block 800. For each element on a linked list, a hash function as in FIG. 4 is applied for hashing the identifier of that element to determine values corresponding to the identifier and map to one bit position of the hash bit map in block 810. The identifier of an element to be added to the linked list is also hashed to one bit location on the bit map in block 820, and that location is checked to determine if the value in the bit location is 1 or 0. If it is 0, no possible duplicate exists and the process returns. If the value of the bit position is 1, a possible duplicate exists. Once a possibility of a duplicate is identified, a

comparison of the identifier of the element to be added to the list with the identifier of each element on the list is made to find a duplicate. If a duplicate is found, that fact is reported to the calling process and the process returns (Col. 8, lines 20-35). Harper further discloses the data structure could be a hash table for containing information about the contents of the linked list (Col. 5, lines 29-35). The process of hashing is applied to all groups of inodes in a Unix File system (Col. 12, lines 17-29). Thus, a data structure such as hash bitmap or hash table is provided, and a hash function is applied to the inode identifiers of the file system to determine values corresponding to the inode identifiers. The hashed value is a position in the hash bitmap or hash table. At the position of the data structure, 0 or 1 as the indicator is utilized for indicating an identifier has been used. This technique indicates the steps of ***providing a data structure generated by applying a function to all*** inode identifiers ***in a file system to determine values corresponding to the*** inode identifiers, ***wherein the data structure indicates those values corresponding to the*** inode identifiers ***to indicate all*** inode identifiers ***used in the file system; processing a data structure to determine whether there is a preexisting*** inode ***in the file system having a name that maps, according to the function, to the same value to which the input*** inode identifier ***maps, wherein two*** inodes ***that map to a same value according to the function are capable of having a same name.*** Harper further discloses the hash function could be applied to an identifier space, which consists of the set of all legal variable names or file names permitted by the languages (Col. 2, line 57-Col. 3, line 16). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Harper method by processing a hash bit map as a data structure to

determine a possible duplication of file name, and by using the step of processing, a duplication of file name in the file system could be identified quickly by scanning the hash bit map.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harper [USP 5,765,165].

Regarding to claims 1, 10, and 19, Harper teaches a method, system, and an article of manufacture for utilizing a hash function to speed up the average search for duplicates of file in a UNIX file system (Col. 1, lines 5-49). The Harper method could be used either to detect whether duplicates exist on a linked list or to detect whether an element to be added to a linked list is a duplicate of one which already exists on the linked list (Col. 4, lines 21-29). As shown in FIG. 1-3C, the relationship between the data blocks, the inode, and a directory that references the file is illustrated (Col. 1, line 13-16). As shown in FIG. 8, in order to check whether an element such as a file to be added to a linked list is a duplicate of one already on the list, a hash function to hash the identifier of the added element to one bit position of the hash bit map at step 820 (Col. 8, lines 20-27). As shown in FIG. 4, an identifier space consists of the set of all legal variable names or file names and a hashing function to transform an identifier X into a bucket address (Col. 2, line 57-Col. 3, line 27). As seen, the technique as discussed indicates the step of ***applying a function to map the input file name to a value***. Harper does not explicitly discloses the step of ***providing a data structure generated by applying a function to all file names in a file system to determine values corresponding to the file names, wherein the data structure indicates those values corresponding to the file names to indicate all file names used in the file system; processing a data structure to determine whether there is a preexisting file in the file system having a name that maps, according to the function, to the***

same value to which the input file name maps, wherein two files that map to a same value according to the function are capable of having a same name. However, as shown in FIG. 8 is the flow chart of the method of checking whether an element to be added to a linked list is a duplicate of one already on the list. A hash bit map as a data structure is provided and initialized to 0 in block 800. For each element on a linked list, a hash function as in FIG. 4 is applied for hashing the identifier of that element to determine values corresponding to the identifier and map to one bit position of the hash bit map in block 810. The identifier of an element to be added to the linked list is also hashed to one bit location on the bit map in block 820, and that location is checked to determine if the value in the bit location is 1 or 0. If it is 0, no possible duplicate exists and the process returns. If the value of the bit position is 1, a possible duplicate exists. Once a possibility of a duplicate is identified, a comparison of the identifier of the element to be added to the list with the identifier of each element on the list is made to find a duplicate. If a duplicate is found, that fact is reported to the calling process and the process returns (Col. 8, lines 20-35). Harper further discloses the data structure could be a hash table for containing information about the contents of the linked list (Col. 5, lines 29-35). The process of hashing is applied to all groups of inodes in a Unix File system (Col. 12, lines 17-29). Thus, a data structure such as hash bitmap or hash table is provided, and a hash function is applied to the inode identifiers of the file system to determine values corresponding to the inode identifiers. The hashed value is a position in the hash bitmap or hash table. At the position of the data structure, 0 or 1 as the indicator is utilized for indicating an identifier has been used. This technique indicates the steps of ***providing a***

data structure generated by applying a function to all inode identifiers *in a file system to determine values corresponding to the* inode identifiers, *wherein the data structure indicates those values corresponding to the* inode identifiers *to indicate all* inode identifiers *used in the file system; processing a data structure to determine whether there is a preexisting* inode *in the file system having a name that maps, according to the function, to the same value to which the input* inode identifier *maps, wherein two* inodes *that map to a same value according to the function are capable of having a same name*. Harper further discloses the hash function could be applied to an identifier space, which consists of the set of all legal variable names or file names permitted by the languages (Col. 2, line 57-Col. 3, line 16). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Harper method by processing a hash bit map as a data structure to determine a possible duplication of file name, and by using the step of processing, a duplication of file name in the file system could be identified quickly by scanning the hash bit map.

Regarding to claims 2, 11 and 20, Harper teaches all the claimed subject matters as discussed in claims 1, 10 and 19, Harper further discloses *the mapped-to values require fewer bits of storage than the file names* (Col. 4, lines 29-34).

Regarding to claims 3, 12 and 21, Harper teaches all the claimed subject matters as discussed in claims 1, 10 and 19, Harper further discloses *the function is a hash function that maps the input file name to an integer value, and wherein the data structure*

includes an entry for each possible integer value capable of being generated from the hash function (Col. 2, line 57-Col. 3, line 27 and Col. 4, lines 29-34).

Regarding to claims 4, 13 and 22, Harper teaches all the claimed subject matters as discussed in claims 3, 10, 21, Harper further discloses the step of ***determining whether the entry for the integer value to which the input file name maps indicates the presence of one preexisting file mapping to the same integer value as the input file name*** (Col. 8, lines 25-35).

Regarding to claims 5, 14 and 23, Harper teaches all the claimed subject matters as discussed in claims 4, 13 and 22, Harper further discloses ***the data structure is a one-dimensional array and wherein each entry is capable of having one of two values, further comprising setting the entry to a first value if there is one preexisting file name in the file system that maps to the integer value for the entry, and wherein determining whether there is one preexisting file comprises determining whether the entry for the integer value to which the input file name maps has the first value*** (Col. 5, lines 29-35 and Col. 8, lines 20-35).

Regarding to claims 6, 15 and 24, Harper teaches all the claimed subject matters as discussed in claims 1, 10, 19, Harper further discloses the steps of ***applying the function to each file name in the file system to map each file name to one value; and indicating in the data structure, for each file name, that there is one preexisting file for the value to which the file name maps*** (Col. 8, lines 20-28).

Regarding to claims 7, 16 and 25, Harper teaches all the claimed subject matters as discussed in claims 6, 15 and 24, Harper further discloses the step of ***scanning each file in the file system to determine if there is at least one preexisting file having the same name as the input file name if there is one preexisting file in the file system having a name that maps, according to the function, to the same value to which the input file name maps*** (Col. 8, lines 29-35).

Regarding to claims 8, 17 and 26, Harper teaches all the claimed subject matters as discussed in claims 7, 16 and 25, Harper does not explicitly disclose the step of ***adding the input file as a new file to the file system if no preexisting file in the file system has the same name as the input file name; and rejecting the access request if there is a preexisting file in the file system having the same name***. However, as shown in FIG. 8, when an element such as a file is added to the file system, the element identifier is checked for a possible duplicate and if there is no duplicate, the process return at step 850, otherwise the fact is reported to the calling process. Thus, the calling process is the process for adding a file to the file system and obviously, the Harper process of adding a file will ***add the input file as a new file to the file system if no preexisting file in the file system has the same name as the input file name; and rejecting the access request if there is a preexisting file in the file system having the same name*** by displaying a message as in most of conventional file system such as Window 95. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Harper

method by including the step of adding the input file and rejecting the input file in order to add a file to the file system.

Regarding to claims 9, 18 and 27, Harper teaches all the claimed subject matters as discussed in claims 7, 16 and 25, but fails to disclose the step of ***updating a preexisting file in the file system having the same name as the input file with the data in the input file if there is such a preexisting file; and rejecting the access request if there is no preexisting file in the file system having the same name as the input file name.*** However, as shown in FIG. 8, when an element such as a file is added to the file system, the element identifier is checked for a possible duplicate and if there is no duplicate, the process return at step 850, otherwise the fact is reported to the calling process. In order to update a preexisting file, the Harper process could be modified by return to the calling process if a duplicate occurs and report to the calling process if there is no match. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Harper method by including the step of updating if there is a preexisting file and rejecting if there is no preexisting file in order to update a file in a file system.

Regarding to claims 28, 31 and 34, Harper teaches all the claimed subject matters as discussed in claims 1, 10 and 19, Harper further discloses the step of ***searching the file system for one preexisting file having the same name as the input file name if the data structure indicates that one preexisting file has a name that maps, according to the***

function, to the same value to which the input file maps; and performing an operation if the file system includes one preexisting file having the same name as the input file (Col. 8, lines 25-35).

Regarding to claims 29, 32 and 35, Harper teaches all the claimed subject matters as discussed in claims 28, 31 and 34, Harper does not explicitly disclose the step of ***applying update data to the preexisting file having the same name as the input file if the file system includes one preexisting file having the same name as the input file***. However, as shown in FIG. 1, Harper teaches that the file name "proposal" is associated with an inode number pointing to the inode containing information about the file "proposal." The inode number "248231" points to inode 24823 which contains information about the file "proposal" such as when the file was created, and when it was last modified. The inode points to data blocks. The data blocks contain the actual characters in the file such as the textual contents of the "proposal" after which the file was named (Col. 1, lines 40-49). Thus, if the calling process is an updating process, and there is a preexisting file having the same name as the input file after comparing the identifier with identifier of each element on the list (Col. 8, lines 25-35), obviously, the updated data such as date, and the actual data of the file will be applied to the preexisting file. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Harper method by including the step of applying update data to the preexisting file in order to update a file in a file system.

Regarding to claims 30, 33 and 36, Harper teaches all the claimed subject matters as discussed in claims 28, 31, 34, Harper does not explicitly disclose the steps of ***returning an error if the file system includes one preexisting file having the same name as the input file; and adding the input file to the file system if the file system does not include one preexisting file having the same name as the input file***. However, as shown in FIG. 8, when an element such as a file is added to the file system, the element identifier is checked for a possible duplicate and if there is no duplicate, the process return at step 850, otherwise the fact is reported to the calling process. Thus, the calling process is the process for adding a file to the file system. And obviously, the step of adding the file to the file system will be executed if there is no duplicate, otherwise, the fact is reported as the step of returning an error. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Harper method by using the step of returning an error or adding the input file name in order to add a file to a file system.

5. Claims 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harper [USP 5,765,165] in view of Williams [USP 5,990,810].

Regarding to claims 37-39, Harper teaches all the claimed subject matters as discussed in claim 1, 10, and 10, but fails to disclose the function comprises ***a wide hash function to produce a large number of possible hash values to minimize the likelihood that the application of the hash function to file names in the file system would have a same hash value.***

Williams teaches ***a wide hash function to produce a large number of possible hash values to minimize the likelihood that the application of the hash function to file names in the file system would have a same hash value*** (Williams, Col. 11, lines 25-45). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Harper method, system, and an article of manufacture by using a wide hash function in order to avoid the collision when applying the hash function.

6. Claims 40, 42 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harper [USP 5,765,165] in view of Bereznyi et al. [6,449,695 B1].

Regarding to claims 40, 42 and 44, Harper teaches all the claimed subject matters as discussed in claim 1, 10 and 19, Harper fails to disclose step of storing the data structure indicating all fie names used in the file system in cache memory, wherein the data structure is scanned to determine whether there is a preexisting file without reading directory information form storage locations in a storage device. However, as disclosed by Harper, one way of searching a linked list for duplicates is to compare the first element with each of the remaining elements in the list in a first pass. Then the next element is taken and compared with each subsequent element in the list (Harper, Col. 7, lines 28-46). The process as discussed in claims 1, 10 and 19 is to avoid the reading of the whole list. Bereznyi teach the hash table is stored in cache (Bereznyi, Col. 26, lines 34-47). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the Harper method, system and article of

manufacture by including the technique of storing the hash table in cache and avoid reading the whole list of inodes in order to speed up the search of a file name in a file system.

Allowable Subject Matter

7. Claims 41, 43 and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding to claim 41, 43 and 45, Harper teaches all the claimed subject matters as discussed in claim 1, 10 and 19, but fails to teach or suggest ***the data structure includes multiple columns for different directories in the file system to indicate file names in different directories of the file system***.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q PHAM whose telephone number is 703-605-4242. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KIM Y VU can be reached on 703-305-4393. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Examiner Hung Pham
October 22, 2003

SHAHID ALAM
PRIMARY EXAMINER